

A new facility at Air Force Plant 42 (AFP 42) in Palmdale, Calif., offers the latest in training technology for firefighters and was designed to protect the environment.

Officially dedicated on Dec. 15, the \$2.5 million “zero discharge” firefighting training facility uses clean-burning liquefied propane, which, when burned, emits little or no hydrocarbons into the air. Previously, firefighting training pits at the plant burned jet fuel to simulate fires, which produced lingering, dark clouds of smoke. Those pits are now closed.

“Transitioning from using jet fuel to clean-burning propane has been one of our top priorities,” said Lt. Col. Robert Catlin, Detachment 1 commander at the plant. “During the planning stages, it was mandatory that this facility operate on propane. We were not willing to negotiate on that design characteristic.”

Plans to construct the new facility

Training facility switches to propane



A firefighting vehicle moves in to douse propane-fueled flames at the new firefighting training facility at Air Force Plant 42 in Palmdale, Calif. The demonstration was part of the facility's official dedication ceremony Dec. 15.

began in 1997, but were delayed while the Air Force considered design changes to include various elements of Federal Aviation Administration training components that were different from the traditional Air Force design. The final plan — certified by the Air Force Civil Engineering Support Agency at Tyndall AFB, Fla. — is a hybrid system that combines both manual control features and a computer-aided support system for optimal responses during drills.

“The facility is manually operated from a central control tower and each of the live-fire training scenarios are continuously monitored by the computer for firefighter safety,” explained project manager George Parker, U.S. Army Corps of Engineers, AFP 42. “The computer monitors burn temperatures, propane flow rate and fuel pressures. If there are problems with any of these elements, the computer initiates an automatic shut down of all systems and will not allow for restart until the problem is resolved.”

Unlike the standard Air Force design, which generally comprises one training

area, the facility has two separate aircraft mock-ups within the training center. One of the areas has a 125-foot burn ring for fuel fire training. At the adjoining incident trainer, a full spectrum of scenarios can be programmed, ranging from engine fires, aircraft cockpit, cabin and wheel brake fires, and three-dimensional running fuel fires. According to Parker, each of the scenarios can be duplicated to standardize such things as flame size and intensity so that all firefighters get the same level of training.

To comply with environmental regulations, the facility features a double 80-mm, high-density polyethylene liner system and a 10,000-gallon, above-ground storage tank. The area beneath each burn pit has a series of rock, sand and fabric grid layers to hold and stabilize liquids that accumulate during drills. Rather than storing the liquids in a traditional holding pond, they are conveyed via an underground piping system. “When the tank is full, the water is tested for any constituents

(See **Firefighter**, page 6)

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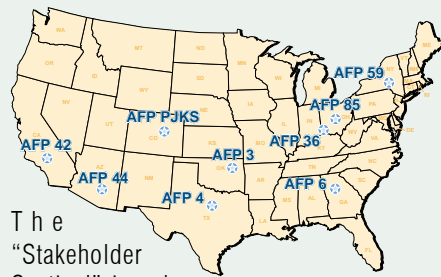
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The "Stakeholder Sentinel" is published to provide community members with up-to-date information on environmental activities at Air Force industrial plants. The Aeronautical Systems Center (ASC), Acquisition Environmental, Safety and Health Division at Wright-Patterson AFB, Ohio, manages the cleanup at nine plants, called Government-Owned, Contractor-Operated facilities, located across the United States. This Air Force newsletter is an authorized publication of the Aeronautical Systems Center. The intent of this publication is to report on environmental activities and programs taking place at the nine industrial plants. Contents of the "Stakeholder Sentinel" are not necessarily the official views of, or endorsed by, the U.S. Government, the Department of Defense, or the Air Force. "Stakeholder Sentinel" is published under contract with IT Corporation, a private firm in no way connected with the U. S. Air Force. Editorial content is edited, prepared and provided by the environmental staff of ASC Office of Public Affairs. For more information, call 1-800-982-7248, ext. 322, 346, or 301. Or, visit our home page at:

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Community Activities CALENDAR

Air Force Plant 4, Fort Worth, Texas

- Restoration Advisory Board Meetings, May 11 & August 10, 2000, 6 - 8 p.m., Carswell Lanes Bowling Center, NAS Fort Worth JRB.
- Carswell Air Show, May 12 - 14, 2000, NAS Fort Worth JRB.

Air Force Plant 42, Palmdale, Calif.

- California Poppy Festival, April 8 & 9, 2000, Lancaster.
- Environmental Restoration Advisory Board Meeting, April 12, 2000, 6:30 p.m., Antelope Valley Inn, Lancaster.
- "Salute to Youth" at AFP 42, April 28, 2000

Editors Note: The above dates are subject to change. For the latest updates, look for notices on meetings and other events in your local newspaper or through direct mailings to your home. For more information, call 1 (800) 982-7248, ext. 322.

ASC environmental director

Mr. Richard G. Whitney is currently the Chief of Acquisition Environmental, Safety and Health (ESH) Division, Engineering Directorate, Aeronautical Systems Center, Air Force Materiel Command, Wright-Patterson Air Force Base, Ohio.

He manages over \$100 million annually in appropriated and other source funds, including leases and property sales proceeds, as landlord for the Air Force industrial plants. An additional \$30 million annually is invested in pollution prevention projects through support to weapon system program offices seeking safer, more environmentally healthy alternatives to hazardous materials and processes.

Mr. Whitney served 10 years active duty with the Army Corps of Engineers as Company Commander, Battalion Staff Officer, Chemistry Professor and finally Resident Engineer at the Kwajalein Missile Range, Marshall Islands. Active duty was followed by 12 years of reserve duty with assignments at New England Division, Nashville and Middle East (Rear) Districts of the Corps of Engineers and

Air Force Plant 44, Tucson, Ariz.

- Unified Community Advisory Board Meeting, March 15, 2000, 6:30 p.m., El Pueblo Neighborhood Center, Tucson.
- Environmental Fair at Challenger Middle School, April 7, 2000.
- Tucson Earth Day Festival & Parade, April 15, 2000, 9 a.m. - 1 p.m., Tucson Children's Museum.

Air Force Plant PJKS, Waterton, Colo.

- Restoration Advisory Board Meeting, March 21, 2000, 6:30 p.m., Holiday Inn, Lakewood.

Assistant Professor of Chemistry at the U.S. Military Academy. He retired from the Army Corps of Engineers (Reserves) as a Lieutenant Colonel and is a graduate of the Army War College. Prior to his present position, Mr. Whitney has been Chief Engineer, Director of Long Range Planning and Programming, and Technical Director with various organizations at Wright-Patterson.

A native of South Portland, Maine, Mr. Whitney graduated from the U.S. Military Academy at West Point, has an MS degree in Analytical Chemistry from Pennsylvania State University and an MBA from the University of Dayton, and is a registered Professional Engineer. He is married to Barbara Ann Whitney. They have five children and four grandchildren.



Richard G. Whitney

Final cleanup plan in place at AFP 59

Implementation of the final cleanup plan for Air Force Plant 59 (AFP 59) provides a boost to the quality of drinking water in the Johnson City, N.Y., area. The cleanup plan entails an extensive upgrade to the village's old water treatment facility. The purpose of the upgrade is to treat contamination entering the region's water supply from several sources surrounding the wellfield. The AFP 59 environmental restoration team implemented the final remediation plan for the plant, with the resulting water treatment system becoming fully operational in June 1999.

AFP 59 is north of the area's New York State Electric and Gas power plant and 1,000 feet northeast of Johnson City's Camden Street Wellfield. As one of the Air Force's Government-Owned, Contractor-Operated facilities, AFP 59 has manufactured aircraft-related products since 1942. Lockheed Martin now operates the facility through a sublease with the Broom County Industrial Development Agency, under a Contract for Deed with the Air Force.

Located at Wright-Patterson AFB, Ohio, ASC's Directorate of Engineering, Division of Acquisition Environmental, Safety and Health oversees the environmental cleanup of AFP 59. According to John Doecker, Integrated Product Team Chief for AFP 59, the cleanup plan required approval by the various environmental regulators before it could be introduced to the public. "Regulators, city officials and community members are satisfied with the plan," Doecker said.

The plan describes the design, construction, and activation of an upgrade to an old water treatment system at the wellfield. The new treatment system targets volatile organic compounds (VOCs) such as metal degreasers that migrate from AFP 59 and other sources and travel through the area's groundwater. Extensive investigation and studies determined

that the only contamination from AFP 59 itself is a VOC plume in the area of the Clinton Street-Ballpark Aquifer. However, higher concentrations of VOCs are emanating from other sources surrounding the wellfield.

Although a variety of possible cleanup treatments were analyzed, including treating groundwater on the plant site, a water treatment facility upgrade at the Camden Street Wellfield was selected. The treatment facility, known as an air stripper, promotes evaporation of the VOCs from the groundwater and is similar to the one already in operation in the nearby town of Vestal, N.Y. The previous air stripper was capable of treating water from only one of the area's supply wells. The cleanup plan updated and expanded this system's capabilities to manage all three production wells in the well field. In this way, all VOCs, regardless of their points of origin, are removed from the municipal drinking water system.

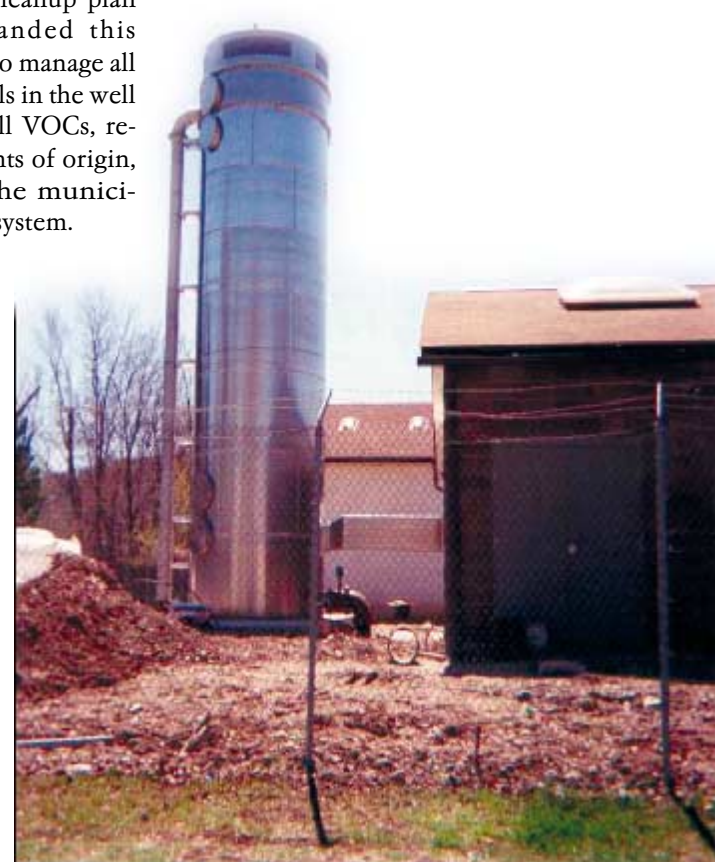
Doecker sees the selection of this alternative as the most sensible solution to Johnson City's groundwater contamination. "Treating the water in the plant area wasn't the best option, since groundwater flowing under the plant would become re-contaminated by the time it reached the wellfield. By upgrading the water treatment facility to handle all three production wells, we can treat

the VOCs from any source, not just (Plant) 59."

On September 10, 1998, the Village of Johnson City and the Air Force signed a Memorandum of Agreement to define the financial responsibility of both parties for the proposed upgrade. The plan received final approval from the state environmental regulator, the New York State Department of Environmental Conservation, in July 1999, and the upgraded water treatment system is now fully operational. Total cost of the upgrade, based on cost estimates received during the open bid process conducted by the Village of Johnson City, was \$1,104,000. The Air Force is paying approximately 90 percent of this cost.

"Although the selected plan's initial cost is higher than alternative measures considered, it provides the best balance of protection to human health and the environment, effectiveness, treatment, and long-term cost," said Doecker.

**— By Daniel Johnson
ASC Public Affairs**



The new water treatment system is now in place at the Camden Street Wellfield, and will handle volatile organic compounds from all sources.

Trees that clean

Natural remedy removes TCE from groundwater

Years ago, the notion of using trees to remove contamination sounded far-fetched. Today, however, scientists are finding this natural remedy not only is easy to apply, but also cost-effective.

Engineers from Aeronautical Systems Center (ASC) at Wright-Patterson Air Force Base, Ohio, are transitioning this process from the lab to the field. The technology, called phytoremediation, uses plants and trees to remove pollutants from soil and groundwater. It is now being field-tested at Air Force Plant 4 (AFP 4) in Fort Worth, Texas, by the AFP 4 environmental restoration team.

According to Greg Harvey, industrial hygienist and project manager with the ASC Acquisition Environmental, Safety and Health Division, phytoremediation promises to be a cost-effective and sustainable way of doing business.

AFP 4 project

This demonstration has allowed me to take a path outside normal remediation channels and approaches and changed my conception of the possibilities with regard to cleaning up shallow groundwater,” said Harvey.

Harvey proposed the project to the Department of Defense, Environmental Security Technology Certification Program in 1995, where initial funding was provided, as well as ongoing support.

Studies show the phytoremediation project to be equally efficient and less costly than many of the mechanical pump-and-treat systems traditionally used. At AFP 4, it is one of several technologies being explored to augment existing cleanup systems.

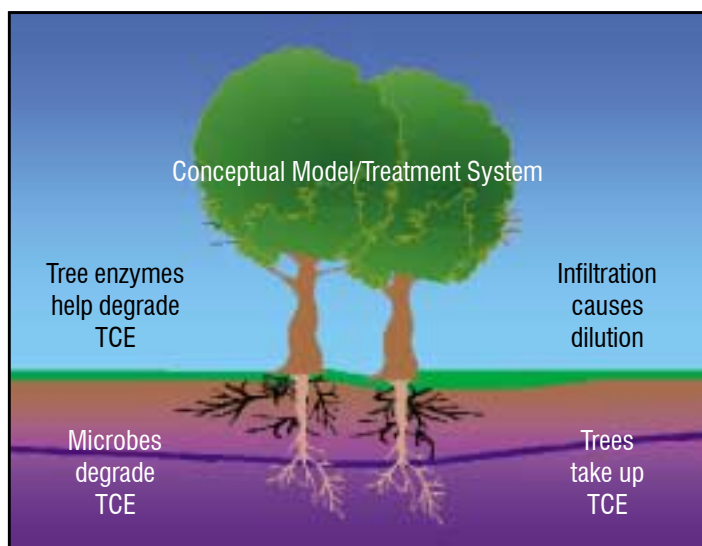
“The Landfill 3 pump-and-treat operation at AFP 4 cost almost \$1 million for initial start up and \$300,000 annually. The cost of the phytoremediation project plants, however, was less than \$50,000,” Harvey explained. He added, “The total cost of the field demonstration to validate the project has been over \$1 million; however, application of the proven technology will save money in the long-term.”

A natural remedy for a tough problem

The phytoremediation project at AFP 4 is evaluating how well cottonwood trees can remove contamination. More than 700 saplings were planted in April 1996, as part of the project to clean up a plume of trichlorethylene (TCE) in the groundwater system. The trees planted at Carswell Field at AFP 4 are eastern cottonwoods, a type of poplar, and are planted in an area where the groundwater is 10 to 12 feet below the surface.

As part of this field demonstration, TCE concentrations are being monitored in the groundwater, soil, and tree tissues. Monitoring results show that a mature eastern cottonwood tree, growing to heights of 80 feet, can draw up to 350 gallons of water from the aquifer each day.

Dr. James Vose of the U.S. Forestry Service measures tree water usage in the Carswell Field plantation.



This graphic illustrates how trees remove TCE from the soil.

“Cottonwood trees are being used in this demonstration because they are easily rooted, grow quickly, and withdraw large volumes of water from the soil—serving as a natural pump-and-treat system,” explained Harvey. “Some of the saplings, about an inch above the ground when they were planted, grew more

than 10 feet in the first year and have grown more than 35 in the past 4 years.”

Plants that clean up contamination

Studies show that certain plants can break down organic pollutants by acting as filters or traps. Phytoremediation can be used to clean up metals, pesticides, solvents, explosives and crude oil, according to Environmental Protection Agency (EPA) studies.

In laboratory tests involving certain hybrids of the fast-growing poplar trees, studies reveal that these natural crops have been found to act like 100-foot straws that extract contamination from soil and groundwater. A benefit of these natural, resilient crops is their ability to stabilize slopes and reduce soil erosion.

Today, scientists and ecologists are investigating broader uses of trees, while exploring how the visible trunk and branches, as well as the root structures, actually help to clean up the environment.

Initial results at AFP 4 show the trees are removing the cleaning solvent TCE from the groundwater. TCE is the primary chemical contaminant of concern at the plant. Harvey said testing in November 1997, before the trees had been in the ground a year, indicated that some TCE had been absorbed and broken down.

Researchers at the EPA-Athens Laboratory have shown that all trees tested to date at the Carswell Field have the ability to break down chlorinated hydrocarbons. Additional work is underway to develop a model of how trees use water that may be applicable to environmental restoration worldwide.

In addition to the restoration ben-

efits, the growing and harvesting of plants on a contaminated site are aesthetically pleasing and a solar-driven way to clean soil and air, according to Harvey.

Environmental condition at AFP 4

Environmental contamination at AFP 4, which has manufactured military aircraft since 1942, was confirmed in the 1980s. The Air Force Installation Restoration Program is cleaning up sites at the plant and at Carswell Field, where hazardous substances, such as TCE and other volatile organic compounds, are being removed from soils and groundwater. In 1990, the EPA placed AFP 4 on the National Priorities List.

The AFP 4 phytoremediation project combines the efforts of the Air Force, EPA, Environmental Security Technology Certification Program, Air Force Base Conversion Agency, Air Force Center for Environmental Excellence, U.S. Geological Survey and the U.S. Forest Service. This technology also is being conducted as part of the DOD's Environmental Security Technology Certification Program, as well as the EPA's Superfund Innovative Technology Evaluation Program.

In addition, environmental experts are exploring the possibility of employing the phytoremediation technology at AFP PJKS, located in Waterton, Colo.

According to Harvey, phytoremediation seems to be the best of all worlds. It is proven to be effective and inexpensive, and trees are always more attractive than the steel pipes and pumps of a water treatment system.

— By Tiffany Pitts
ASC Public Affairs



Project manager Greg Harvey inspects the plantation site at AFP 4, where 700 saplings were planted in 1996 as part of the phytoremediation project.

Treatment system expanded at AFP 4

— By Daniel Johnson, ASC Public Affairs

The soil vapor extraction (SVE) system at AFP 4 in Fort Worth, Texas, was expanded in 1999 after it proved effective in the plant's cleanup program. "After six months of operation, the expanded SVE system was able to remove about 50 pounds of trichloroethylene (TCE) per day," said George Walters, remedial project manager for the plant. TCE is the primary chemical of concern to environmental

Limited metal treatment operations continue today in Bldg. 181 with control systems to prevent future contamination.

The Air Force began the pilot-scale test of an SVE system as a response to concerns of TCE contamination in the soil under Bldg. 181. The pilot-scale test was used to determine if TCE contamination could be effectively extracted from the soil. The system treats gases produced by the

remove contaminated water and vapor from the ground. The groundwater treatment system removes the TCE from the groundwater through air stripping.

As part of the expansion, the existing pilot-scale system was removed and refurbished. Components of the pilot-scale system were used whenever possible to reduce equipment costs for the new system. For example, the expanded system utilizes 11 vapor extraction wells and four dual-phase extraction wells from the pilot-scale system, and required the installation of 18 new wells.

Extracted vapor and air stripper gases are destroyed by catalytic oxidation, removing a minimum of 90 percent of the TCE and hydrochloric acid in accordance with TNRCC requirements. Following catalytic oxidation, the vapors are conveyed to a quench/scrubber for cooling and the removal of hydrochloric acid vapor prior to discharge to the atmosphere. Groundwater from the extraction wells and condensation water from the vapor/liquid separators are treated by air stripping before being routed to the city of Fort Worth's sanitary sewer system.

Walters states that the Air Force's remediation plan is the best way to approach contamination beneath Bldg. 181. "The pilot-scale system told us which technology would work best (at Bldg. 181). Expanding that system saved us money and time over designing a whole new one. We're removing more TCE for less money."



Some components of the pilot-scale soil vapor extraction system were used in the upgrade to treat TCE contamination under Bldg. 181 at AFP 4.

remediation experts at the plant.

This new SVE system treats contamination in the soil beneath Bldg. 181, a chemical processing facility. Spills of TCE reportedly occurred within the chemical processing facility. Trenches, sumps, floor drains, and buried pipelines present throughout this manufacturing facility were possible pathways for TCE to enter the soil under the building. Although TCE was detected at very low concentrations around the perimeter of the building, soil beneath the building became saturated with the solvent. This was discovered during the installation of the pilot-scale SVE system in 1993.

air stripper and vapor extracted from the soil prior to release into the atmosphere. Because the pilot-scale system was successful, the Air Force chose to upgrade the system, as the best alternative for treatment of contamination around the building. The upgrade to the system has been accepted by the U.S. Environmental Protection Agency (EPA) and the Texas Natural Resource Conservation Commission (TNRCC) as the final cleanup action for Bldg. 181.

The SVE system expansion involved increasing its capability and installation of dual-phase extraction (DPE) wells and a groundwater treatment system. The DPE wells

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(Continued from page 1)

beyond the acceptable levels set by the local water quality control agency," explained Parker. "If it tests clean, we reuse the water for dust control or tree row irrigation. But if there are any constituents detected, the material is disposed of as hazardous waste."

To save costs, pulverized asphalt concrete from a former runway at the plant was used to construct the surface roads encircling the facility. The storage tank that holds accumulated liquids was recycled from the now-closed Wastewater Treatment Plant and a vacant 20,000-gallon propane tank was relocated from another site. "We took available government resources and unused facilities that would have ended up in a landfill and reused them," said Parker.

A ribbon-cutting ceremony to commemorate the grand opening of the new training facility took place Dec. 15 at the plant. Col. Ronald Channell, deputy director of the Aeronautical Systems Center, Engineering Directorate at Wright-Patterson AFB, which manages the plant, was keynote speaker. State and local officials made special presentations commending the facility's operational and environmental features, to include a certificate presented by Palmdale mayor Jim Ledford.

— By Larine Barr
ASC Public Affairs

At right, John Adams, AFP 44 engineer, adjusts the soil vapor extraction system at a former disposal site where TCE vapors are being removed from the soil.

Below, a well is installed to monitor cleanup of the regional aquifer.



Aggressive technologies speed cleanup at AFP 44

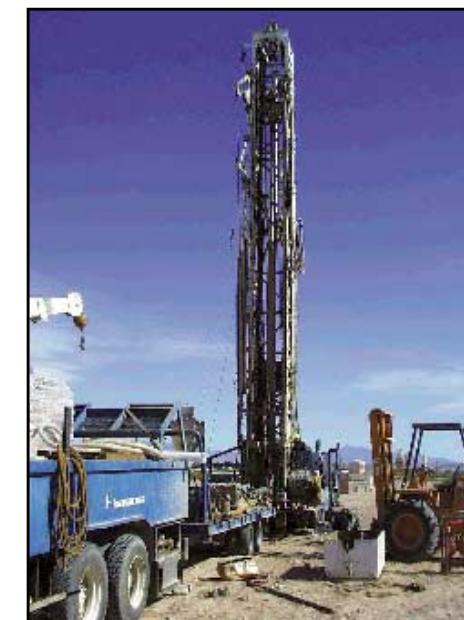
When environmental cleanup at Air Force Plant 44 in Tucson, Ariz. began more than a decade ago, the contamination under ground stretched a daunting seven miles long and one mile wide. Today, contamination levels inside the plume have been reduced by nearly 80 percent.

The decline is due, in part, to the aggressive operation of a groundwater treatment system, built on site at Air Force Plant 44 in 1987. The system has been extracting volatile organic compounds, primarily trichloroethylene (TCE), which were discovered in 1981 in the groundwater below Air Force Plant 44 and nearby Tucson Airport. In 1983, the Environmental Protection Agency placed the area of contamination, known as the Tucson International Airport Area Superfund site, on the National Priorities List, ranking it in a group of the nation's most contaminated areas. Those responsible for cleaning up the Superfund site include Air Force Plant 44, Arizona Air National Guard, City of Tucson, Tucson Airport Authority and several private companies.

In the years since TCE was discovered, engineers at the Aeronautical Systems Center (ASC), Wright-Patterson Air Force Base, which manages cleanup at Air Force Plant 44, have concentrated on finding the best technologies available for cleaning the soils and groundwater at the facility. The entire

effort involves 12 sites, where solvents such as TCE, heavy metals and other industrial materials were disposed of — and over time — leached into the soils and groundwater.

According to Dennis Scott, Air Force Plant 44 team chief, ASC Acquisition Environmental, Safety and Health Division, the program's aim has been to accelerate the cleanup using a hard-hitting combination of innovative, cost-effective technologies. As a result, the program has saved an estimated \$3 million and cut over two years from the cleanup schedule.



"We continually look for ways to speed up the remediation, while cutting costs and improving efficiencies," explained Scott, whose involvement with the program spans six years.

One of the most efficient cleanup methods has been the groundwater treatment system. In its 12 years of operation, the \$28 million facility, with its extensive network of extraction wells, air stripping towers and carbon filtration units, has pumped and treated over 18 billion gallons of water.

"The treatment facility has had a lot of success because of its dynamic wellfield operation, which allows us to respond to changes in the contaminant plume and target the areas of highest concentration," said ASC engineer Corey Lam, remedial project manager for Air Force Plant 44.

In addition to the groundwater treatment system, other methods are showing measurable results. Soil vapor extraction, currently operating at three of the 12 sites, has been effective in removing TCE vapors from the soils. It uses variable-depth wells that pump evaporated compounds from tiny air spaces in the soil. Special resin filters were initially used in the treatment process, which has helped cut TCE concentrations to below state cleanup levels.

"Soil vapor extraction has been so effective at one particular site — a former

(See **Technologies**, page 9)

AFP 42 completes second phase of investigation

Air Force Plant 42 in Palmdale, Calif., is completing the second phase of an investigation to evaluate the groundwater and soil at the plant. Shallow and deep soil samples were collected at 14 of the 27 sites identified for cleanup under the Installation Restoration Program.

A draft remedial investigation report is being finalized and will help pinpoint and determine the extent of the contamination at the sites. Most of the contamination consists of petroleum products, lead, cleaning solvents, polychlorinated biphenyls (PCBs), and paints. In addition to sampling the soil, engineers conducted a groundwater study, which tested all wells on the plant property. According to George Warner, remedial project manager for Air Force Plant 42, low levels of the cleaning solvent trichloroethylene (TCE) were detected in two wells. "This is being further investigated to determine the source," Warner said. "Engineers are studying historical records and aerial photographs to learn where the TCE may have originated."



A field technician takes a shallow soil sample at Site 6, using the direct push method.

To simplify the investigation process, all 27 sites have been grouped into five operable units. Operable unit 1 contains sites with petroleum contamination, operable unit 2 consists of former fire training areas, operable unit 3 has former disposal sites, operable unit 4 consists of fuel spill areas, and operable unit 5 includes sites located in the common area of the plant.

To date, investigations have been completed for operable units 1 through 3. A report detailing the study was released February 2000 for public review at the Lancaster and Palmdale libraries. A feasibility study, which evaluates cleanup

alternatives and recommends cleanup actions for each site, will be conducted for these sites in mid-2000. Warner said the remaining operable units will be investigated this year and continue through 2003.

Members of the Air Force Plant 42 Environmental Restoration Advisory Board, a community-based group of 15 local citizens, will work with the Air Force to review the report and provide comments to decision-makers. "These residents volunteer their time and are committed to helping the Air Force make decisions that will protect the environment and benefit the entire community," Warner said. "Their involvement is an integral part of our environmental cleanup program."

Air Force Plant 42 is a Government-Owned, Contractor-Operated facility, which began operation in 1942. Since 1953, the plant has supported final assembly and flight testing of high performance aircraft, to include the B-1, B-2, F-117 and U-2. The Aeronautical Systems Center, Acquisition Environmental, Safety and Health Division, at Wright-Patterson Air Force Base, Ohio, manages cleanup for the plant. The restoration program got underway in 1983 with an extensive records search.

—By Larine Barr
ASC Public Affairs



Workers disconnect a pipe column from a drinking well sampled during the investigation.



Air Force transfers title of AFP 3 to Tulsa

— By Daniel Johnson, ASC Public Affairs

Officials from the Aeronautical Systems Center's Acquisition Environmental, Safety and Health Division, Wright-Patterson AFB, Ohio, transferred a 337-acre parcel of land to the city of Tulsa, Okla., Dec. 1, 1999. The property, an industrial facility known as Air Force Plant 3 (AFP 3), was used by Air Force contractors for the manufacture of aircraft and components. Through the years, various contractors were responsible for the day-to-day operation of the plant.

The plant was constructed by the U.S. Army Corps of Engineers in 1941 in support of World War II. The Douglas Aircraft Company (later McDonnell Douglas) began manufacturing in 1942, primarily A-24 dive bombers and A-26 Invaders for the Army Air Corps. Operations were suspended at the plant after the war. The Air Force reactivated the plant in 1951 to produce B-47 Stratojets for the Korean conflict. The plant later produced the B-66 bomber and F-4 Phantom. During the 1960s, McDonnell Douglas used the plant to conduct depot maintenance operations for government and private aircraft. In 1962, Rockwell International joined McDonnell Douglas at the plant to manufacture aerospace products.

McDonnell Douglas-Tulsa ceased its operations and vacated the facilities in 1994. Later that year, the city of Tulsa leased a portion of the plant from the Air Force, subleasing it to Rockwell (now Boeing) to produce components for commercial and military aircraft and the International Space Station. In May 1995, the Air Force leased the remainder of the property to the city. In turn, the city subleased portions of the property to various subtenants, and used the plant for industrial economic redevelopment.

One of the Air Force's roles at AFP 3 has been managing the environmental cleanup of sites identified in the February 1995 Environmental Baseline Survey (EBS). The EBS was updated in April 1999 to facilitate the title transfer and describes the current environmental condition of the facility. Chemical releases over the years contaminated the shallow water-bearing zone, a near-surface aquifer located five to 15 feet below ground surface. This shallow aquifer is considered unfavorable for development as potable water due to insufficient yields and a high level of dissolved minerals, resulting in poor to fair quality. According to John Doecker, AFP 3 Divestiture Program Manager at Wright-Patterson, "Contamination in this aquifer poses little or no risk to workers at the facility or residents near the plant due to the improbability of anyone using the water." Surveys conducted by the Tulsa City County Health Department and the Oklahoma Water Resources Board determined that there are no active domestic wells drawing from this water-bearing zone. Additionally, there is no hydraulic connection to deeper aquifers, so contamination cannot leak into other water resources. Surface water from reservoirs in the northeastern portion of the state is the primary source of municipal water for the city of Tulsa and AFP 3.

Transfer of the title to Tulsa does not completely end the Air Force's involvement with the environmental cleanup at the plant per the transfer agreement. "The Air Force and Oklahoma Department of Environmental Quality will continue to monitor the environmental condition of the plant for the next five years and may be involved with reactivating the water treatment facility, if needed," said Doecker. "We will con-

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(Continued from page 7)

landfill — we've been able to shut down about half the extraction wells there, because we are no longer detecting contamination," Lam said. "As a result, we are close to finishing the cleanup at this site, about two years ahead of schedule."

Another technology demonstrating success, called dual-phase extraction, is enhancing cleanup at a 70-acre site, known as the shallow groundwater zone. This area poses a challenge, because TCE is imbedded in a 40-foot clay layer. "Dual-phase extraction can attack the TCE here because it pumps groundwater and extracts soil vapors simultaneously from the same well. This process lowers the water table, exposing a larger amount of the TCE to the more effective, soil vapor extraction method," explained Lam.

In an effort to find the most efficient cleanup methods, many of the newer, advanced technologies are screened and field-tested at the plant through a cooperative agreement between the Air Force and the University of Arizona. A few of the ideas tested at the plant include: extraction wells with enhanced capabilities; bioremediation, which uses naturally-occurring microorganisms to break down TCE; and surfactants, an improved way to dissolve TCE from clay layers.

"Our collaboration with the university is a cost-effective way to evaluate lesser-known technologies, which in turn helps us to make decisions on process improvements for the cleanup," said Lam.

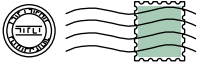
— By Larine Barr
ASC Public Affairs

tinue our stewardship into the future."

AFP 3 is one of several industrial plants scheduled to be divested. The plan is designed to dispose of industrial facilities that are excess to the government's ownership needs. This is accomplished through transfer, lease or sale of the plants, while addressing environmental cleanup issues, plant operations and maintenance support. For AFP 3, environmental management will focus on ensuring that contamination in the groundwater poses no risk to workers or nearby residents.

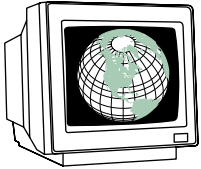
How you can get more information

If you are interested in environmental activities at our Air Force industrial plants, there are several ways to get more information.



Mailing Lists

We maintain community mailing lists for each of our nine Air Force industrial plants. If you, or someone you know, would like to be added to our mailing list, please call our toll-free number listed below.



Internet

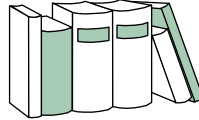
Our web site at <http://www.ascenv.wpafb.af.mil> includes information about our organization. Find out more about our pollution prevention, compliance, restoration, and safety and health programs. The site also details ongoing restoration activities at each plant. Or, e-mail our staff at:

larine.barr@wpafb.af.mil
daniel.johnson@wpafb.af.mil
don.yates@wpafb.af.mil



Contact Numbers.

To contact one of our public affairs specialists, call our toll-free number at (800) 982-7248. Extensions include: Larine Barr, ext. 322; Daniel Johnson, ext. 346; and Don Yates, ext. 301.



Administrative Record/ Information Repository

The Air Force maintains an Administrative Record for each Air Force plant at Wright-Patterson Air Force Base in Dayton, Ohio. The record contains documents on cleanup efforts and is available to the public for review. The Air Force also maintains an information repository, located near each plant, which contains information pertinent to the cleanup effort, as well as related material.

ASC/ENVR, Building 8
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Wright-Patterson AFB, OH 45433-7626

SENTINEL
Stakeholder